

AMENDMENTS TO THE CLAIMS

In the Claims

1. (Previously Presented) A directly modulated, distributed feedback gain-coupled laser having an output beam responsive to the application of an input biasing current, comprising an active region to which a grating is applied such that gain-coupling defined by $\text{Im}(kL)$ is at least 0.06.
2. (Cancel)
3. (Currently Amended) A laser according to claim ~~2~~ 1 in which the gain coupling is sufficient to provide, in ~~the~~ an environment in which the laser is to operate, a significant reduction in the received power penalty from a laser having less gain coupling.
4. (Currently Amended) A laser according to claim ~~2~~ 3, in which the level of gain coupling exceeds a threshold level, whereby, in the environment in which the laser is to operate, there is a significant reduction in received power penalty from a laser with gain-coupling less than the threshold level, but no significant further reduction in received power penalty will be obtained from a laser with gain-coupling greater than the threshold level.
5. (Currently Amended) A laser according to claim ~~2~~ 3 in which, in the environment in which the laser is to operate, the level of gain coupling is sufficient to provide a 3dB reduction in the received power penalty from a laser having no gain coupling.
6. (Original) A laser according to claim 1 in which the input biasing current is modulated at a frequency which approaches the relaxation oscillation frequency of the laser output.
7. (Currently Amended) A laser according to claim ~~2~~ 3 in which the environment is uncooled.

8. (withdrawn) A method of creating a laser comprising the steps of:
- (a) growing a semiconductor substrate;
 - (b) depositing a first doped semiconductor layer upon the substrate;
 - (c) creating an active semiconductor region over the first doped layer;
 - (d) depositing a second doped semiconductor layer having a charge opposite to that of the first doped layer upon the active region;
 - (e) defining an index grating which extends along the length of the semiconductor layers;
 - (f) selectively etching away the second doped layer and at least a portion of the active region in accordance with the layout of the index grating to a depth sufficient to produce a gain coupling sufficient to overdamp the output response of the resulting device;
 - (g) infilling the etched regions with doped material consistent with the composition of the second doped layer;
 - (h) removing the substrate;
 - (i) etching the semiconductor layers to a suitable width and cleaving the semiconductor layers to a suitable length; and
 - (j) adjusting the reflectivity of the front and rear facets so as to permit lasing to occur when a biasing signal is applied across the junctions created by the semiconductor layers, whereby the output response of the laser is adapted to quickly respond to a change in the current level of the applied biasing signal.